

WHAT IS CLAIMED IS:

1. A surface acoustic wave filter comprising a piezoelectric substrate, and a first reflector, a first IDT, a second IDT, a third IDT, and a second reflector, arranged on the piezoelectric substrate in that order in the direction of propagation of a surface acoustic wave, wherein the first and third IDTs, connected in parallel to each other, are connected to an unbalanced signal terminal, and the second IDT includes two separate electrodes arranged in the direction of propagation of the surface acoustic wave, electrically connected in series with each other at a serial junction, and respectively connected to balanced signal terminals; wherein

the outermost electrode fingers of the second IDT adjacent to the first IDT and the third IDT are connected to the serial junction;

the outermost electrode finger of the first IDT adjacent to the second IDT is connected to the unbalanced signal terminal;

the outermost electrode finger of the third IDT adjacent to the second IDT is grounded; and

the first IDT only or both the first IDT and the third IDT are weighted so that the number of exciting regions of the surface acoustic wave in the first IDT adjacent to the second IDT is equal to the number of exciting regions in the third IDT adjacent to the second IDT.

2. A surface acoustic wave filter according to claim 1, wherein the serial junction of the second IDT is grounded.

3. A surface acoustic wave filter according to claim 1, wherein the serial junction of the second IDT is grounded through an electrode finger of one of the first IDT and the third IDT.

4. A communication apparatus comprising a surface acoustic wave filter according to claim 1.

5. A surface acoustic wave filter comprising a piezoelectric substrate, and a first reflector, a first IDT, a second IDT, a third IDT, and a second reflector, arranged on the piezoelectric substrate in that order in the direction of propagation of a surface acoustic wave, wherein the first and third IDTs, connected in parallel to each other, are connected together to an unbalanced signal terminal, and the second IDT includes two

separate electrodes arranged in the direction of propagation of the surface acoustic wave, electrically connected in series with each other at a serial junction, and respectively connected to balanced signal terminals; wherein

the outermost electrode fingers of the second IDT adjacent to the first IDT and the third IDT are connected to the serial junction;

the outermost electrode finger of the first IDT adjacent to the second IDT is connected to the unbalanced signal terminal;

the outermost electrode finger of the third IDT adjacent to the second IDT is grounded; and

the first IDT is serial connection weighted.

6. A surface acoustic wave filter according to claim 5, wherein the first through fifth electrode fingers of the first IDT closest to the second IDT are serial connection weighted.

7. A surface acoustic wave filter according to claim 5, wherein the serial junction of the second IDT is grounded.

8. A surface acoustic wave filter according to claim 5, wherein the serial junction of the second IDT is grounded through an electrode finger of one of the first IDT and the third IDT.

9. A communication apparatus comprising a surface acoustic wave filter according to claim 5.

10. A surface acoustic wave filter comprising a piezoelectric substrate, and a first reflector, a first IDT, a second IDT, a third IDT, and a second reflector, arranged on the piezoelectric substrate in that order in the direction of propagation of a surface acoustic wave, wherein the first and third IDTs, connected in parallel to each other, are connected together to an unbalanced signal terminal, and the second IDT includes two separate electrodes arranged in the direction of propagation of the surface acoustic wave, electrically connected in series with each other at a serial junction, and respectively connected to balanced signal terminals; wherein

the outermost electrode fingers of the second IDT adjacent to the first IDT and the third IDT are connected to the serial junction;

the outermost electrode finger of the first IDT adjacent to the second IDT is connected to the unbalanced signal terminal;

the outermost electrode finger of the third IDT adjacent to the second IDT is grounded; and

the outermost electrode finger of the first IDT adjacent to the second IDT is apodization weighted.

11. A surface acoustic wave filter according to claim 10, wherein the outermost electrode finger of the first IDT adjacent to the second IDT is approximately half the length of the other electrode fingers of the first IDT to achieve apodization weighting, the surface acoustic wave filter includes a dummy electrode finger that is arranged in an extension line extending from the end of the apodization weighted electrode finger, and the dummy electrode finger is provided in an area of an IDT electrode of the first IDT different from an IDT electrode of the first IDT having the apodization weighted electrode finger.

12. A surface acoustic wave filter according to claim 10, wherein the first and second outermost electrode fingers of the first IDT adjacent to the second IDT are approximately $3/4$ the length of the other electrode fingers of the first IDT to achieve apodization weighting, the surface acoustic wave filter includes a dummy electrode finger that is arranged in an extension line extending from the ends of the apodization weighted electrode fingers, and the dummy electrode finger is provided in an area of an IDT electrode of the first IDT different from an IDT electrode of the first IDT having the apodization weighted electrode finger.

13. A surface acoustic wave filter according to claim 10, wherein the serial junction of the second IDT is grounded.

14. A surface acoustic wave filter according to claim 10, wherein the serial junction of the second IDT is grounded through an electrode finger of one of the first IDT and the third IDT.

15. A communication apparatus comprising a surface acoustic wave filter according to claim 10.

16. A surface acoustic wave filter comprising a piezoelectric substrate, and a first reflector, a first IDT, a second IDT, a third IDT, and a second reflector, arranged on

the piezoelectric substrate in that order in the direction of propagation of a surface acoustic wave, wherein the first and third IDTs, connected in parallel to each other, are connected together to an unbalanced signal terminal, and the second IDT includes two separate electrodes arranged in the direction of propagation of the surface acoustic wave, electrically connected in series with each other at a serial junction, and respectively connected to balanced signal terminals; wherein

the outermost electrode fingers of the second IDT adjacent to the first IDT and the third IDT are connected to the serial junction;

the first and second outermost electrode fingers of the first IDT adjacent to the second IDT are grounded;

the outermost electrode finger of the third IDT adjacent to the second IDT is grounded, an electrode finger of the third IDT, connected to one of the unbalanced signal terminals, closest to the second IDT is approximately half the length of the other electrode fingers of the third IDT to achieve apodization weighting, and the surface acoustic wave filter includes a dummy electrode finger that is arranged in an extension line extending from the end of the apodization weighted electrode finger; and

the dummy electrode finger is provided in an area of an IDT electrode of the third IDT different from an IDT electrode of the third IDT having the apodization weighted electrode finger.

17. A surface acoustic wave filter according to claim 16, wherein the serial junction of the second IDT is grounded.

18. A surface acoustic wave filter according to claim 16, wherein the serial junction of the second IDT is grounded through an electrode finger of one of the first IDT and the third IDT.

19. A communication apparatus comprising a surface acoustic wave filter according to claim 16.